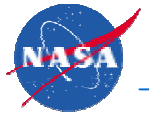
Space Environment Testbeds Description

The SET initiative also complements the LWS program and provides significant partnership opportunities and benefits:

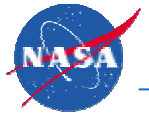
- Common support hardware and software to validate subsystem or component designs on orbit
- NASA-provided launches, on-orbit operation, and data return
- Standard agreement with payload partners to provide ground test data, on-orbit data after reduction, and funding for integration
- Negotiable partnering agreement based on NASA interest and partner contribution to launch
- Correlative environmental measurements
- Technology infusion into NASA science programs
- Operation in high-radiation orbits
- Leveraging of existing programs (including ground test programs such as the Electronics Radiation Characterization (ERC), space environment and effects program, and DoD technology development programs)
- Flexibility in payload partnership guidelines and variations (for example, variations from the guideline that both NASA and payload partner should both benefit from the partnership might result in trading spacecraft systems for data access, or in-kind contributions in lieu of funding). Partnerships can also include cooperative agreements, fee for service, Memoranda of Agreements, and Space Act Agreements.
- SET launched every 3 years



Space Environment Testbeds
Goals and Objectives

The use of environment-tolerant systems in place of environment-hard systems shifts the focus from risk avoidance to risk management and requires a better understanding of on-orbit performance for risk assessment analyses. Goals and objectives are to:

- Understand space environment effects on current and emerging technologies and biosystems
- Understand application of space weather predictions for risk management of new technologies
- Establish ground test protocols for new technologies
- Validate models
- Demonstrate instrumentation for LWS core missions
- Improve environmental guidance for spacecraft design and operations



Space Environment Testbeds
Targeted Opportunities

The SET initiative will employ a combination of flight opportunities to accomplish the stated goals and objectives. These include the following:

- LWS Core Missions
  - RBMs have the ideal orbit for technology testbeds because of their high exposure to trapped and transient particles. This is useful for many effects, including ionizing dose, spacecraft charging, single particle hits (single event effects), and solar cell damage. Harsh environments are required to induce failures and demonstrate the technology for deep space exploration.
  - IMs are deployed in polar orbits necessary for single event effects studies
- Commercial satellite industry
- DoD
- CNES-provided Ariane launch